(1) The test report must be maintained at each location where the packaging is manufactured, certified, and a design qualification test or periodic retest is conducted. The test report must be maintained as follows:

Responsible party	Duration
Person manufacturing the packaging	As long as manufactured and two years thereafter.
Person performing design testing	Until next required periodic retest is successfully performed, a new test report produced, and five years thereafter.
Person performing periodic retesting	Until next required periodic retest is successfully performed and a new test report produced.

(2) The test report must be made available to a user of a packaging or a representative of the Department upon request. The test report, at a minimum, must contain the following information:

(i) Name and address of test facility;

(ii) Name and address of applicant (where appropriate);

(iii) A unique test report identification;

(iv) Date of the test report;

(v) Manufacturer of the packaging;

(vi) Description of the packaging design type (e.g., dimensions, materials, closures, thickness, *etc.*), including methods of manufacture (e.g., blow molding) and which may include drawing(s) and/or photograph(s);

(vii) Maximum capacity;

(viii) Characteristics of test contents, e.g., viscosity and relative density for liquids and particle size for solids;

(ix) Test descriptions and results; and

(x) Signed with the name and title of signatory.

[Amdt. 178–97, 55 FR 52723, Dec. 21, 1990, as amended at 56 FR 66285, Dec. 20, 1991; 57 FR 45465, Oct. 1, 1992; Amdt. 178–102, 59 FR 28494, June 2, 1994; Amdt. 178–106, 59 FR 67521, 67522, Dec. 29, 1994; Amdt. 178–117, 61 FR 50628, Sept. 26, 1996; 66 FR 45386, Aug. 28, 2001; 67 FR 53143, Aug. 14, 2002; 68 FR 75758, Dec. 31, 2003; 68 FR 61942, Oct. 30, 2003; 75 FR 5396, Feb. 2, 2010; 75 FR 60339, Sept. 30, 2010; 77 FR 60944, Oct. 5, 2012; 78 FR 1118, Jan. 7, 2013; 78 FR 14715, Mar. 7, 2013]

§ 178.602 Preparation of packagings and packages for testing.

(a) Except as otherwise provided in this subchapter, each packaging and package must be closed in preparation for testing and tests must be carried out in the same manner as if prepared for transportation, including inner packagings in the case of combination packagings.

(b) For the drop and stacking test, inner and single-unit receptacles other than bags must be filled to not less than 95% of maximum capacity (see §171.8 of this subchapter) in the case of solids and not less than 98% of maximum in the case of liquids. Bags containing solids shall be filled to the maximum mass at which they may be used. The material to be transported in the packagings may be replaced by a non-hazardous material, except for chemical compatibility testing or where this would invalidate the results of the tests.

(c) If the material to be transported is replaced for test purposes by a non-hazardous material, the material used must be of the same or higher specific gravity as the material to be carried, and its other physical properties (grain, size, viscosity) which might influence the results of the required tests must correspond as closely as possible to those of the hazardous material to be transported. Water may also be used for the liquid drop test under the conditions specified in §178.603(e) of this subpart. It is permissible to use additives, such as bags of lead shot, to achieve the requisite total package mass, so long as they are placed so that the test results are not affected.

(d) Paper or fiberboard packagings must be conditioned for at least 24 hours immediately prior to testing in an atmosphere maintained—

(1) At 50 percent ±2 percent relative humidity, and at a temperature of 23 °C±2 °C (73 °F±4 °F). Average values should fall within these limits. Short-term fluctuations and measurement limitations may cause individual measurements to vary by up to ±5 percent relative humidity without significant impairment of test reproducibility;

(2) At 65 percent ±2 percent relative humidity, and at a temperature of 20

°C±2 °C (68 °F±4 °F), or 27 °C±2 °C (81 °F±4 °F). Average values should fall within these limits. Short-term fluctuations and measurement limitations may cause individual measurements to vary by up to ±5 percent relative humidity without significant impairment of test reproducibility; or

(3) For testing at periodic intervals only (i.e., other than initial design qualification testing), at ambient conditions.

(e) Except as otherwise provided, each packaging must be closed in preparation for testing in the same manner as if prepared for actual shipment. All closures must be installed using proper techniques and torques.

(f) Bung-type barrels made of natural wood must be left filled with water for at least 24 hours before the tests.

[Amdt. 178–97, 55 FR 52723, Dec. 21, 1990, as amended at 56 FR 66286, Dec. 20, 1991; Amdt. 178–106, 59 FR 67522, Dec. 29, 1994; 69 FR 76186, Dec. 20, 2004; 71 FR 78635, Dec. 29, 2006]

§ 178.603 Drop test.

(a) *General.* The drop test must be conducted for the qualification of all packaging design types and performed periodically as specified in § 178.601(e). For other than flat drops, the center of gravity of the test packaging must be vertically over the point of impact. Where more than one orientation is possible for a given drop test, the orientation most likely to result in failure of the packaging must be used. The number of drops required and the packages' orientations are as follows:

Packaging	No. of tests (samples)	Drop orientation of samples
Steel drums, Aluminum drums, Metal drums (other than steel or aluminum), Steel Jerricans, Plywood drums, Wooden barrels, Fiber drums, Plastic drums and Jerricans, Composite packagings which are in the shape of a drum.	Six—(three for each drop).	First drop (using three samples): The package must strike the target diagonally on the chime or, if the packaging has no chime, on a circumferential seam or an edge. Second drop (using the other three samples): The package must strike the target on the weakest part not tested by the first drop, for example a closure or, for some 7 cylindrical drums, the welded longitudinal seam of the drum body.
Boxes of natural wood, Plywood boxes, Reconstituted wood boxes, Fiberboard boxes, Plastic boxes, Steel, aluminum or other metal boxes, Composite packagings that are in the shape of a box.	Five—(one for each drop).	First drop: Flat on the bottom (using the first sample). Second drop: Flat on the top (using the second sample). Third drop: Flat on the long side (using the third sample). Fourth drop: Flat on the short side (using the fourth sample). Fifth drop: On a corner (using the fifth sample).
Bags—single-ply with a side seam	Three—(three drops per bag).	First drop: Flat on a wide face (using all three samples). Second drop: Flat on a narrow face (using all three samples). Third drop: On an end of the bag (using all three samples).
Bags—single-ply without a side seam, or multi-ply.	Three—(two drops per bag).	First drop: Flat on a wide face (using all three samples). Second drop: On an end of the bag (using all three samples).

(b) *Exceptions.* For testing of single or composite packagings constructed of stainless steel, nickel, or monel at periodic intervals only (i.e., other than design qualification testing), the drop test may be conducted with two samples, one sample each for the two drop orientations. These samples may have been previously used for the hydrostatic pressure or stacking test. Exceptions for the number of steel, aluminum and other metal packaging samples used for conducting the drop test are subject to the approval of the Associate Administrator.

(c) *Special preparation of test samples for the drop test.* (1) Testing of plastic drums, plastic jerricans, plastic boxes other than expanded polystyrene boxes, composite packagings (plastic material), and combination packagings with plastic inner packagings other than plastic bags intended to contain solids or articles must be carried out when the temperature of the test sample and its contents has been reduced to −18 °C (0 °F) or lower. Test liquids must be kept in the liquid state, if necessary, by the addition of anti-freeze. Water/anti-freeze solutions with a minimum specific gravity of 0.95 for testing at −18 °C (0 °F) or lower are considered acceptable test liquids. Test samples prepared in this way are not required to be conditioned in accordance with § 178.602(d).